AF/Jtrw

Docket 87069JLT
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

William D. Ramsden, et al

ASCORBIC ACID COMPOUNDS AS REDUCING AGENTS FOR THERMALLY DEVELOPABLE COMPOSITIONS AND IMAGING MATERIALS

Serial No. 10/764,704

Filed January 26, 2004

Group Art Unit: 1752

Examiner: Walke, Amanda C.

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Sherryl A. Payne

May 12, 2006
Date

Mail Stop APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

APPEAL BRIEF TRANSMITTAL

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Commissioner is hereby authorized to charge the Appeal Brief filing fee to Eastman Kodak Company Deposit Account 05-0225. **A duplicate copy of this letter is enclosed.**

Respectfully submitted,

J. Lanny Tucker

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Attorney for Appellants
Registration No. 27,678

Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

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APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134

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APPELLANT'S BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 1-31 that was contained in the Office Action mailed November 15, 2006.

A timely Notice of Appeal was filed February 15, 2006.

A timely Pre-Appeal Brief Request for Reconsideration was filed with the Notice of Appeal on February 15, 2006. A Notice of Panel Decision was mailed April 13, 2006 in which the decision was to proceed to the Honorable Board for consideration of the issue outlined in the Final Rejection.

Real Party In Interest

The real party in interest is Eastman Kodak Company, the assignee of the inventors' entire interests.

Related Appeals And Interferences

None.

Status Of The Claims

The latest papers indicate that Claims 1 – 31 stand finally rejected and are the subject of this appeal. However, Claim 12 was cancelled in an amendment filed August 23, 2005. This was not acknowledged in the Final Rejection. Appellants erroneously included Claim 12 in their Request for Reconsideration mailed January 12, 2006 and continued this error in their Notice of Appeal and Pre-Appeal Brief.

Thus, only Claims 1-11 and 13-31 are on appeal.

Status Of Amendments

No amendments were presented after the Final Rejection.

Summary of Claimed Subject Matter

The present invention is directed to aqueous-based thermally developable black-and-white compositions and materials that can be used in photothermography and thermography. In both of these imaging fields, the image is produced using a thermal development (that is, heating) step. In photothermography, imaging using a source of irradiation, such as an IR laser, precedes thermal development. In thermography, both imaging and development occur simultaneously using thermal means. In both thermography and photothermography, a common component of the imaging composition is a non-photosensitive organic silver salt comprising silver and an organic ligand. One such organic silver salt is silver benzotriazole that belongs to a class of organic silver salts comprising silver-complexing ligands having an imino group.

An important distinction in thermally developable compositions and imaging materials is the type of solvent "system" out of which the layers (especially, the imaging layers) are coated. Much of the literature and industry (including the commercial DryView® Medical films sold by Eastman Kodak Company) are directed to organic solvent-based compositions and materials whereby the imaging components are formulated in organic coating solvents such as methyl ethyl ketone. Other patent literature and commercial photothermographic films sold by Fuji Photo in Japan are directed to aqueous-based compositions and materials where water is the predominant coating solvent.

The distinction in solvents very likely dictates the type of binder that can be used, the type of imaging components, and their reactivity. It is not merely the case of taking a known component from one coating system and "dropping" it into the other. Extensive research is required to make the various components in each system work well to provide imaging as well as minimize the defects that arise from premature reaction before imaging (hence pre-imaging instability) and continued reaction after developer (hence instability after image formation, or "post-processing" instability).

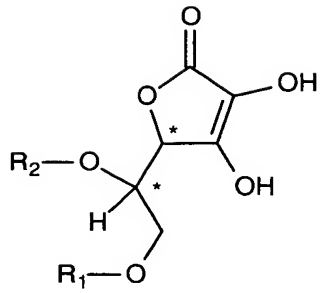
The reduction of the silver ions in organic silver salts, such as silver benzotriazole, to silver metal in thermally developable materials requires

another important chemical component, that is, a relatively strong reducing agent. What reducing agents work well in organic solvent-based systems do not necessarily work well in aqueous-based systems.

A typical reducing agent (or developer) taught in the art for aqueous-based systems is ascorbic acid that is known to provide useful photospeed (for photothermography), adequate Dmax, and low Dmin. Derivatives (such as esters) of ascorbic acid have also been described in the art as reducing agents for silver ions in organic silver salts. For example, ascorbic acid palmitate, dipalmitate, stearate, myristate, and laurate are described in the art for this purpose.

However, researchers have found that these compounds have been disadvantageous for one reason or another and there has been considerable work in the industry to develop other strong reducing agents particularly for aqueous-based thermally developable materials using silver benzotriazole, for example, as the non-photosensitive organic silver salt. Because some imaging systems include components that may lead to image instability, especially in aqueous-based imaging materials, there has also been a continuing need to find the most suitable silver ion reducing agents to improve post-processing light stability of the imaged materials. For example, the presence of residual water or the action of high humidity on aqueous-based thermally developable compositions and materials has presented a constant and significant challenge to workers in this field.

Appellants have found that a specific class of reducing agents provides improved post-processing print stability of images in aqueous-based, thermally developable compositions and materials containing organic silver salts such as silver benzotriazole. These reducing agents are compounds represented by the following Structure (I) that is also recited in the broadest generic claims on appeal:



(I)

wherein R_1 and R_2 are independently hydrogen or an acyl group having 11 or fewer carbon atoms, provided that at least one of R_1 and R_2 is an acyl group.

Grounds of Rejection to be Reviewed on Appeal

The sole ground of rejection to be considered in this appeal is the rejection of Claims 1-31 (actually Claims 1-11 and 13-31) as unpatentable under 35 U.S.C. 103(a) over either U.S. Patent 6,440,649 (Simpson et al.) or 6,573,033 (Simpson et al.) in view of FR 1,542,505 (Ohkubo et al., identified as "Masuta" in the Office Action, corresponding to U.S. Patent 3,927,889) and JP 02-048659 (Taguchi).

Appellants respectfully disagree with this rejection for the reasons presented below and ask the Honorable Board to reverse it.

Arguments

The Final Rejection alleges that each of the Simpson et al. patents describes X-radiation sensitive photothermographic materials containing phosphors. These materials, known as "dry silver" materials further comprise a photosensitive catalyst, non-photosensitive source of reducible silver ions, reducing composition, and a hydrophobic or hydrophilic binder. The Final Rejection alleges the usefulness of fluorescent intensifying screens with the photothermographic materials but fails to cite relevant prior art. The Final Rejection also admits that the Simpson et al. patents are silent as to Appellants' specific ascorbic acid derivatives as reducing agents.

For purposes of simplicity, the two Simpson et al. references ("Simpson et al.") are considered as a single reference since their teaching is essentially the same for purposes of the present application and appeal.

"Masuta" is cited in the Final Rejection as teaching photothermographic silver halide films containing silver benzotriazole and a "reducing agent meeting the instant claim limitations", a binder, and a photosensitive silver halide (preferably silver bromide and/or iodide). The Final Rejection (page 4) is confusing, however, in that is states that "Masuta" anticipates the "instant claims", yet the rejection is under Section 103.

Taguchi is cited for disclosing a thermally developable photosensitive material comprising a binder, photosensitive silver halide (AgBrI), a dye/reducing agent that "meets the instant claim limitations", and a tetrazole compound.

The Examiner admits that Simpson et al. fails to teach the use of the critical ascorbic acid derivatives required in the present invention as reducing agents. Moreover, neither Simpson et al. reference is directed to the problem of improved "post-processing" print stability of the resulting black-and-white images.

Appellants respectfully submit that neither "Masuta" nor Taguchi supplies the teaching missing from Simpson et al. to establish a *prima facie* basis for the unpatentability rejection. Thus, the combined cited teaching fails to teach or suggest the presently claimed aqueous-based, black-and-white thermally developable compositions and materials containing the specific ascorbic acid derivatives as reducing agents.

Appellants respectfully point out that "Masuta" fails to direct a skilled artisan to aqueous-based photothermographic materials and compositions. The only teaching about formulations and binders is found in the Masuta Examples (TABLE 1) where polyvinyl butyral is used as the binder and the formulation was prepared and coated out of an organic solvent. This is descriptive of typical early teaching relating to organic-solvent based photothermographic materials, not aqueous-based materials.

More importantly, this reference teaches the use of a number of water insoluble but organic solvent soluble higher alkyl ascorbic acid esters such as 1-ascorbyl palmitate, laurate, myristate, and stearate, as reducing agents. These individual reducing agents are not suggestive of Appellants' specific class of water soluble reducing agents. The compounds of Masuta are apparently designed for use only in organic solvent-based imaging systems not aqueous-based imaging systems. This difference in solubility of ascorbic acid esters is just one example of the unpredictability in chemistry as well as the complex imaging environment for thermography and photothermography when changing from organic to aqueous coating. Thus, Matsuda's individual reducing agents are not suggestive of Appellants' specific class of reducing agent.

While Appellants dispute the assertion that a *prima facie* basis for obviousness has been made with the combination of "Masuta" and/or Taguchi with either Simpson et al. reference, even if that position is conceded for the sake of argument, Appellants have effectively rebutted it with a clear and convincing showing of unexpected results that has not been given the proper probative weight in evaluating patentability.

Appellants have demonstrated that the compounds within the scope of the present invention unexpectedly provide improved results over the use of ascorbic acid (see Appellants Examples 1 and 2, pages 46-57 with data in TABLES III and IV). The data demonstrate an advantage especially for the improvement in post-processing print stability ("Light Box Test" in TABLE III and the reduced change in Dmin shown in TABLE IV). There is no reason to believe that every ester of ascorbic acid will do this merely because some esters are useful in this manner.

To further demonstrate that the results from use of the ascorbic acid derivatives of Structure (I) are unexpected over and unpredictable from the teaching of the prior art, Appellants tried to use a conventional ascorbic acid derivative known in the art, 1-ascorbyl palmitate, in the presently claimed aqueous-based invention. A **Rule 132 Declaration** ("Declaration 1") presented with Appellants' response dated August 23, 2005 by co-Appellant James Philip, Jr. provides evidence that this compound of the prior art could not be dissolved in the

aqueous formulation. While the noted ester may be useful in the organic solvent-based materials of Masuta, it is thus useless in the aqueous-based thermally developable composition of the present invention. This disadvantage is not apparent from or suggested by the teaching in the art cited in the Final Rejection (especially "Masuta").

When the Examiner suggested that Appellants had presented an insufficient showing of unexpected results with Declaration 1, Appellants presented another **Rule 132 Declaration** ("Declaration 2") with their response dated January 12, 2006 in which Dr. Philip carried out the same experiments and attempted to use the laurate, myristate, and stearate esters of ascorbic acid, as taught in "Masuta", in aqueous-based formulations. None of these esters could be dissolved and used in Appellants' aqueous-based formulations and are thus also useless in the practice of the presently claimed invention. Again, this is contrary to any expectation because they appear to be useful in the organic solvent-based materials of Masuta.

Thus, Appellants evaluated four of the ascorbic acid esters suggested in "Masuta" as reducing agents for organic solvent-based photothermographic materials and found that they could not be used in the aqueous-based compositions and materials of the presently claimed invention. None of these esters would dissolve in water even when heated at 55°C and with application of sonic energy for one half hour. In contrast, when the same premix was prepared using a molar equivalent amount of 1-ascorbyl pivalate (Compound I-1 of the invention), complete dissolution occurred at 55°C with sonic energy. Additionally, the esters taught in "Masuta" would not dissolve in a mixture of 50% water and 50% methanol even when the mixture was heated at 40°C (Declaration 2). In contrast, Appellants' 1-ascorbyl pivalate was soluble in such a mixture. Because of the unpredictable properties of such chemical compounds in the various coating systems, a skilled worker would not therefore be motivated by "Masuta" to use Appellants' specific class of reducing agents of Structure (I) in the present invention.

In the Advisory Action, the Examiner has alleged that the claimed invention is unpatentable because the Masuta reference "teaches compounds

wherein the R groups may be alkyl or aryl (phenyl), and would be comparable to inventive compounds I-7 and I-26 amongst others with various 1-6 carbon alkyl groups, thus, the rejection is maintained". Yet, Appellants have not tried just one compound suggested by "Masuta" but the three specific esters evaluated in TABLE 1 and a fourth ester (stearate ester) that is also within the scope of the formulae in Col. 3. They have tested the preferred esters of "Masuta". This is clearly a good faith, sufficient, and unrefuted effort to demonstrate unexpected results under Section 103 for the subject matter of Claims 1-11 and 13-31. They have therefore satisfied the Patent Statute as interpreted by the courts by comparing their invention to what the Examiner considers the closest teaching in the art and demonstrated unexpected results in that those ascorbic acid esters are useless in the practice of the presently claimed invention.

The Examiner suggests that "Masuta" is relied upon for its "teachings that ascorbic compounds are employed in any photothermographic material as reducing agents." Appellants don't deny that there are probably dozens of publications describing the use of ascorbic acid compounds as reducing agents in various photothermographic materials. "Masuta" is clearly one of such publications relating to organic solvent-based materials.

However, Appellants have consistently pointed out that there are various classes of ascorbic acid derivatives, such as classes of esters, known in the art. "Masuta" teaches the use of certain classes of such esters, and mentions three particular ones in its examples. Appellants have also clearly demonstrated that those preferred compounds (as well as the stearate ester) are not useful in the presently claimed invention that includes aqueous-based photothermographic materials (and formulations required to make them). Yet, Appellants have found a unique class of ascorbic acid derivatives (Structure I compounds) that are unexpectedly useful in the aqueous-based compositions and materials of the presently claimed invention to improve post-processing print stability.

Taguchi is no better for supplying the missing teaching. It is directed to "color" media. In view of the different chemistry and chemical mechanisms used for color and black-and-white imaging materials, one skilled in

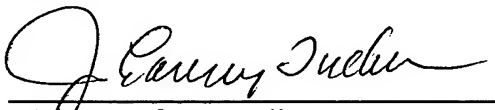
the art would not even consult Taguchi to solve a problem of light instability in black-and-white photothermographic images.

Thus, the secondary references cited in the Final Rejection fail to direct or motivate a skilled artisan to use Appellants' unique class of reducing agents that solve the noted post-processing print instability problem in aqueous-based photothermographic materials, particularly in view of their unrefuted showing of unexpected results that is evidence of unpredictability in this particular art.

At the bottom of page 4 of the Final Rejection, the Examiner argued that Appellants have argued that "Masuta" and Taguchi cannot be combined with the Simpson et al. references. What Appellants have consistently argued is that both secondary references fail to supply teaching to the primary references that renders the claimed invention unpatentable because of the demonstrated unpredictability of using esters of ascorbic acid as reducing agents in Appellants' aqueous-based compositions and materials.

For the foregoing reasons, the Examiner's rejections of claims 1-11 and 13-31 should be reversed.

Respectfully submitted,



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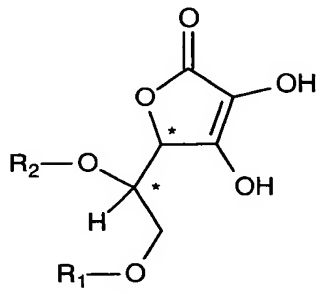
Appendix I - Claims on Appeal

1. An aqueous-based thermally-developable black-and-white composition comprising a binder that is a hydrophilic binder or a water-dispersible polymeric latex, and in reactive association, a non-photosensitive source of reducible silver ions that includes a compound containing an imino group, and a reducing agent for said non-photosensitive source of reducible silver ions,

said reducing agent being a compound, or mixture thereof, represented by the following Structure (I):



(I)

wherein R_1 and R_2 are independently hydrogen or an acyl group having 11 or fewer carbon atoms, provided that at least one of R_1 and R_2 is an acyl group.

2. The composition of claim 1 wherein said acyl group comprises from 2 to 11 carbon atoms.

3. The composition of claim 1 wherein said acyl group comprises a cyclic group or a branched alkyl group.

4. The composition of claim 1 wherein R_1 and R_2 are the same or different acyl groups.

5. The composition of claim 1 wherein said reducing agent comprises one or more compounds defined in Structure I and identified in the following list with the noted R_1 and R_2 groups:

Compound	Derived From	R_1	R_2
I-1	L-ascorbic acid	*t*-Butyl-(C=O)-	H
I-2	D-isoascorbic acid	*t*-Butyl-(C=O)-	H
I-3	L-ascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-4	D-isoascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-5	D-isoascorbic acid	H	*t*-Butyl-(C=O)-
I-6	L-ascorbic acid	*i*-Propyl-(C=O)-	H
I-7	L-ascorbic acid	Ph-(C=O)-	H
I-8	L-ascorbic acid	1-Adamantyl-(C=O)-	H
I-9	L-ascorbic acid	1-Adamantylmethyl-(C=O)-	H
I-10	L-ascorbic acid	1-Methylcyclohexyl-(C=O)-	H
I-11	L-ascorbic acid	2-Adamantylmethyl-(C=O)	H
I-12	L-ascorbic acid	2,2-Dimethylpropyl-(C=O)-	H
I-13	L-ascorbic acid	Cyclohexyl-(C=O)-	H
I-14	L-ascorbic acid	1,1-Dimethylpropyl-(C=O)-	H
I-15	L-ascorbic acid	1-Ethylpropyl-(C=O)-	H
I-16	L-ascorbic acid	2,4,4-Trimethylpentyl-(C=O)-	H
I-17	L-ascorbic acid	2-Methylpropyl-(C=O)-	H
I-18	L-ascorbic acid	Cyclopentyl-(C=O)-	H
I-19	L-ascorbic acid	Diethylamino-(C=O)	H

I-20	L-ascorbic acid	Diethylamino-(C=O)-	Diethylamino-(C=O)-
I-21	L-ascorbic acid	Phenyl-NH-(C=O)-	H
I-22	L-ascorbic acid	Hexyl-NH-(C=O)-	Hexyl-NH-(C=O)-
I-23	L-ascorbic acid	*t*-Butyl-(C=O)-	Ethyl-(C=O)-
I-24	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-
I-25	L-ascorbic acid	Ethyl-O-(C=O)-	H
I-26	L-ascorbic acid	Phenyl-O-(C=O)-	H
I-27	L-ascorbic acid	4-HO-Phenyl-(C=O)-	H
I-28	L-ascorbic acid	2-norbornylmethyl-(C=O)-	H
I-29	L-ascorbic acid	$3,4\text{-}(HO)_2$-Phenyl-(C=O)-	H
I-30	L-ascorbic acid	*i*-Propyl-(C=O)-	*i*-Propyl-(C=O)-
I-31	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-

6. The composition of claim 1 wherein said reducing agent is present in an amount of from about 0.3 to about 1.0 mol/mol of total silver.

7. The composition of claim 1 further comprising a photosensitive silver halide.

8. The composition of claim 1 further comprising a preformed photosensitive silver halide provided predominantly as tabular grains.

9. The thermally developable composition of claim 1 further comprising photosensitive preformed silver bromide or silver iodobromide grains, and wherein said binder is gelatin, a gelatin derivative, a cellulosic material, or a

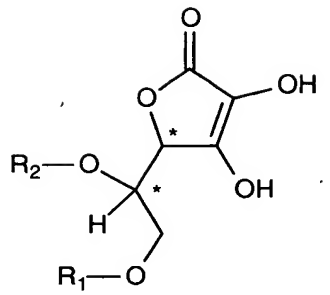
poly(vinyl alcohol), said non-photosensitive source of reducible silver ions includes a silver salt of benzotriazole, said reducing agent comprises one or more compounds defined in Structure I and identified in the following list with the noted R_1 and R_2 groups:

Compound	Derived From	R_1	R_2
I-1	L-ascorbic acid	*t*-Butyl-(C=O)-	H
I-2	D-isoascorbic acid	*t*-Butyl-(C=O)-	H
I-3	L-ascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-4	D-isoascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-5	D-isoascorbic acid	H	*t*-Butyl-(C=O)-
I-6	L-ascorbic acid	*i*-Propyl-(C=O)-	H
I-7	L-ascorbic acid	Ph-(C=O)-	H
I-8	L-ascorbic acid	1-Adamantyl-(C=O)-	H
I-9	L-ascorbic acid	1-Adamantylmethyl-(C=O)-	H
I-10	L-ascorbic acid	1-Methylcyclohexyl-(C=O)-	H
I-11	L-ascorbic acid	2-Adamantylmethyl-(C=O)	H
I-12	L-ascorbic acid	2,2-Dimethylpropyl-(C=O)-	H
I-13	L-ascorbic acid	Cyclohexyl-(C=O)-	H
I-14	L-ascorbic acid	1,1-Dimethylpropyl-(C=O)-	H
I-15	L-ascorbic acid	1-Ethylpropyl-(C=O)-	H
I-16	L-ascorbic acid	2,4,4-Trimethylpentyl-(C=O)-	H
I-17	L-ascorbic acid	2-Methylpropyl-(C=O)-	H
I-18	L-ascorbic acid	Cyclopentyl-(C=O)-	H
I-19	L-ascorbic acid	Diethylamino-(C=O)	H
I-20	L-ascorbic acid	Diethylamino-(C=O)-	Diethylamino-(C=O)-

I-21	L-ascorbic acid	Phenyl-NH-(C=O)-	H
I-22	L-ascorbic acid	Hexyl-NH-(C=O)-	Hexyl-NH-(C=O)-
I-23	L-ascorbic acid	*t*-Butyl-(C=O)-	Ethyl-(C=O)-
I-24	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-
I-25	L-ascorbic acid	Ethyl-O-(C=O)-	H
I-26	L-ascorbic acid	Phenyl-O-(C=O)-	H
I-27	L-ascorbic acid	4-HO-Phenyl-(C=O)-	H
I-28	L-ascorbic acid	2-norbornylmethyl-(C=O)-	H
I-29	L-ascorbic acid	$3,4\text{-}(HO)_2$-Phenyl-(C=O)-	H
I-30	L-ascorbic acid	*i*-Propyl-(C=O)-	*i*-Propyl-(C=O)-
I-31	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-

10. An aqueous-based thermally developable black-and-white imaging material comprising a support and having on at least one side thereon one or more thermally developable imaging layers comprising a binder that is a hydrophilic binder or a water-dispersible polymeric latex, and in reactive association, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, and a reducing agent for said non-photosensitive reducible silver ions,

wherein said reducing agent is a compound, or mixture thereof, represented by the following Structure (I):



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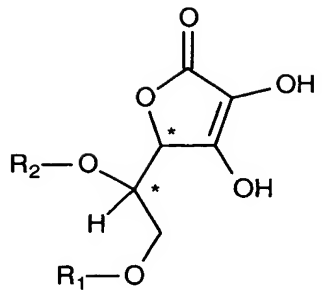
wherein R_1 and R_2 are independently hydrogen or an acyl group having 11 or fewer carbon atoms, provided that at least one of R_1 and R_2 is an acyl group.

11. The material of claim 10 that is a non-photosensitive thermographic material.

13. An aqueous based black-and-white photothermographic material comprising a support and having on at least one side thereon one or more thermally developable imaging layers comprising a binder that is a hydrophilic binder or a water-dispersible polymeric latex, and in reactive association, a photosensitive silver halide, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, a reducing agent for said non-photosensitive reducible silver ions, and optionally an outermost protective layer disposed over said one or more thermally developable imaging layers,

wherein said reducing agent is a compound, or mixture thereof, represented by the following Structure (I):



(I)

wherein R_1 and R_2 are independently hydrogen or an acyl group having 11 or fewer carbon atoms, provided that at least one of R_1 and R_2 is an acyl group.

14. The material of claim 13 further comprising a phosphor in at least one of said thermally developable imaging layers.

15. The material of claim 13 wherein said non-photosensitive source of reducible silver ions includes a silver salt of benzotriazole or a substituted derivative thereof, or mixtures of such silver salts, and said photosensitive silver halide comprises one or more preformed photosensitive silver halides that are provided predominantly as tabular grains.

16. The material of claim 13 wherein said reducing agent is present in an amount of from about 0.3 to about 1.0 mol/mol of total silver.

17. The material of claim 13 wherein said acyl group comprises from 2 to 11 carbon atoms.

18. The material of claim 13 wherein said acyl group comprises a cyclic group or a branched alkyl group.

19. The material of claim 13 wherein said reducing agent comprises one or more compounds defined in Structure I and identified in the following list with the noted R_1 and R_2 groups:

Compound	Derived From	R_1	R_2
I-1	L-ascorbic acid	*t*-Butyl-(C=O)-	H
I-2	D-isoascorbic acid	*t*-Butyl-(C=O)-	H
I-3	L-ascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-4	D-isoascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-5	D-isoascorbic acid	H	*t*-Butyl-(C=O)-
I-6	L-ascorbic acid	*i*-Propyl-(C=O)-	H
I-7	L-ascorbic acid	Ph-(C=O)-	H
I-8	L-ascorbic acid	1-Adamantyl-(C=O)-	H
I-9	L-ascorbic acid	1-Adamantylmethyl-(C=O)-	H
I-10	L-ascorbic acid	1-Methylcyclohexyl-(C=O)-	H
I-11	L-ascorbic acid	2-Adamantylmethyl-(C=O)	H
I-12	L-ascorbic acid	2,2-Dimethylpropyl-(C=O)-	H
I-13	L-ascorbic acid	Cyclohexyl-(C=O)-	H
I-14	L-ascorbic acid	1,1-Dimethylpropyl-(C=O)-	H
I-15	L-ascorbic acid	1-Ethylpropyl-(C=O)-	H
I-16	L-ascorbic acid	2,4,4-Trimethylpentyl-(C=O)-	H
I-17	L-ascorbic acid	2-Methylpropyl-(C=O)-	H
I-18	L-ascorbic acid	Cyclopentyl-(C=O)-	H

I-19	L-ascorbic acid	Diethylamino-(C=O)	H
I-20	L-ascorbic acid	Diethylamino-(C=O)-	Diethylamino-(C=O)-
I-21	L-ascorbic acid	Phenyl-NH-(C=O)-	H
I-22	L-ascorbic acid	Hexyl-NH-(C=O)-	Hexyl-NH-(C=O)-
I-23	L-ascorbic acid	*t*-Butyl-(C=O)-	Ethyl-(C=O)-
I-24	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-
I-25	L-ascorbic acid	Ethyl-O-(C=O)-	H
I-26	L-ascorbic acid	Phenyl-O-(C=O)-	H
I-27	L-ascorbic acid	4-HO-Phenyl-(C=O)-	H
I-28	L-ascorbic acid	2-norbornylmethyl-(C=O)-	H
I-29	L-ascorbic acid	3,4-$(HO)_2$-Phenyl-(C=O)-	H
I-30	L-ascorbic acid	*i*-Propyl-(C=O)-	*i*-Propyl-(C=O)-
I-31	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-

20. The material of claim 13 comprising one or more toners at least one of which is a mercaptotriazole, triazine thione, phthalazine, or phthalazine derivative.

21. A black-and-white aqueous-based photothermographic material that comprises a transparent support having on at least one side thereof:

a) one or more thermally developable imaging layers each comprising a hydrophilic binder that is gelatin, a gelatin derivative, a poly(vinyl alcohol), or a cellulosic material, or is a water-dispersible polymeric latex, and in reactive association,

a preformed photosensitive silver bromide, silver iodobromide, or a mixture thereof, provided predominantly as tabular grains,

a non-photosensitive source of reducible silver ions that includes one or more organic silver salts at least one of which is a silver salt of benzotriazole,

a reducing agent for said non-photosensitive source of reducible silver ions, and

b) optionally, an outermost protective layer disposed over said one or more thermally developable imaging layers, and

wherein said reducing agent comprises one or more compounds defined in Structure I and identified in the following list with the noted R_1 and R_2 groups:

Compound	Derived From	R_1	R_2
I-1	L-ascorbic acid	*t*-Butyl-(C=O)-	H
I-2	D-isoascorbic acid	*t*-Butyl-(C=O)-	H
I-3	L-ascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-4	D-isoascorbic acid	*t*-Butyl-(C=O)-	*t*-Butyl-(C=O)-
I-5	D-isoascorbic acid	H	*t*-Butyl-(C=O)-
I-6	L-ascorbic acid	*i*-Propyl-(C=O)-	H
I-7	L-ascorbic acid	Ph-(C=O)-	H
I-8	L-ascorbic acid	1-Adamantyl-(C=O)-	H
I-9	L-ascorbic acid	1-Adamantylmethyl-(C=O)-	H
I-10	L-ascorbic acid	1-Methylcyclohexyl-(C=O)-	H
I-11	L-ascorbic acid	2-Adamantylmethyl-(C=O)	H
I-12	L-ascorbic acid	2,2-Dimethylpropyl-(C=O)-	H
I-13	L-ascorbic acid	Cyclohexyl-(C=O)-	H

I-14	L-ascorbic acid	1,1-Dimethylpropyl-(C=O)-	H
I-15	L-ascorbic acid	1-Ethylpropyl-(C=O)-	H
I-16	L-ascorbic acid	2,4,4-Trimethylpentyl-(C=O)-	H
I-17	L-ascorbic acid	2-Methylpropyl-(C=O)-	H
I-18	L-ascorbic acid	Cyclopentyl-(C=O)-	H
I-19	L-ascorbic acid	Diethylamino-(C=O)	H
I-20	L-ascorbic acid	Diethylamino-(C=O)-	Diethylamino-(C=O)-
I-21	L-ascorbic acid	Phenyl-NH-(C=O)-	H
I-22	L-ascorbic acid	Hexyl-NH-(C=O)-	Hexyl-NH-(C=O)-
I-23	L-ascorbic acid	*t*-Butyl-(C=O)-	Ethyl-(C=O)-
I-24	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-
I-25	L-ascorbic acid	Ethyl-O-(C=O)-	H
I-26	L-ascorbic acid	Phenyl-O-(C=O)-	H
I-27	L-ascorbic acid	4-HO-Phenyl-(C=O)-	H
I-28	L-ascorbic acid	2-norbornylmethyl-(C=O)-	H
I-29	L-ascorbic acid	3,4-$(HO)_2$-Phenyl-(C=O)-	H
I-30	L-ascorbic acid	*i*-Propyl-(C=O)-	*i*-Propyl-(C=O)-
I-31	L-ascorbic acid	Ethyl-(C=O)-	Ethyl-(C=O)-

22. (original) The material of claim 21 wherein said hydrophilic binder is gelatin or a gelatin derivative, silver benzotriazole is the predominant source of reducible silver ions, and said reducing agent is one or more of Compounds I-1, I-2, I-7, and I-9.

23. An aqueous-based black-and-white photothermographic material comprising a support having on a frontside thereof,

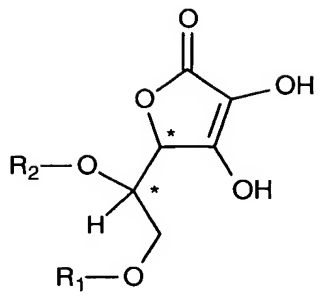
a) one or more frontside thermally developable imaging layers comprising a hydrophilic polymer binder or water-dispersible polymer latex binder, and in reactive association, a photosensitive silver halide, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, a reducing agent for said non-photosensitive source reducible silver ions, and

said material comprising on the backside of said support, one or more backside thermally developable imaging layers comprising a hydrophilic polymer binder or a water-dispersible polymer latex binder, and in reactive association, a photosensitive silver halide, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, and a reducing agent for said non-photosensitive source reducible silver ions, and

b) optionally, an outermost protective layer disposed over said one or more thermally developable imaging layers on either or both sides of said support, and

wherein said one or more thermally developable imaging layers, or said one or more protective layers if present, on both sides of said support have the same or different composition, and

said reducing agents on both sides of said support are the same or different and each reducing agent is a compound, or mixture thereof, represented by the following Structure (I):



(I)

wherein R_1 and R_2 are independently hydrogen or an acyl group having 11 or fewer carbon atoms, provided that at least one of R_1 and R_2 is an acyl group.

24. A method of forming a visible image comprising:

A) imagewise exposing the photothermographic material of claim 13 to form a latent image,

B) simultaneously or sequentially, heating said exposed photothermographic material to develop said latent image into a visible black-and-white image.

25. The method of claim 24 wherein said thermally developable material comprises a transparent support, and said image-forming method further comprises:

C) positioning said exposed and thermally-developed material with the visible image therein between a source of imaging radiation and an imageable material that is sensitive to said imaging radiation, and

D) exposing said imageable material to said imaging radiation through the visible image in said exposed and thermally-developed material to provide an image in said imageable material.

26. The method of claim 24 wherein said imagewise exposing is carried out using visible or X-radiation.

27. The method of claim 24 wherein said thermally developable material is arranged in association with one or more phosphor intensifying screens during imaging.

28. The method of claim 24 wherein said exposed photothermographic material is used for medical diagnosis.

29. A method of forming a visible image comprising:

A) imagewise exposing the photothermographic material of claim 23 to form a latent image,

B) simultaneously or sequentially, heating said exposed photothermographic material to develop said latent image into a visible black-and-white image.

30. An imaging assembly comprising the photothermographic material of claim 13 that is arranged in association with one or more phosphor intensifying screens.

31. A method of forming a black-and-white image comprising exposing the imaging assembly of claim 30 to X-radiation.

Appendix II - Evidence

A copy of each of "Declarations 1 and 2" referred to in Appellants' arguments and submitted during prosecution is presented here.

"Declaration 1"

87069JLT
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

William D. Ramsden, et al.

ASCORBIC ACID COMPOUNDS AS REDUCING AGENTS FOR THERMALLY DEVELOPABLE COMPOSITIONS AND IMAGING MATERIALS

Serial No. 10/764,704

Filed 26 January 2004

Group Art Unit: 1752

Examiner: WALKE, Amanda C.

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

_____
Sherryl A. Payne

_____
Date

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. 1.132

I, James B. Philip, Jr. declare that:

(1) I am a co-inventor of the invention described and claimed in the present application, along with William D. Ramsden, Doreen C. Lynch, and Paul G. Skoug.

(2) I received a Ph.D. degree in physical organic chemistry from the University of Rochester in 1980. In the course of my graduate studies, I was the co-author of 3 publications that were published during 1978-1981.

(3) From November 1980 to July 1996, I was employed by 3M Company; from July 1996 to March 2002, I was employed by Imation

Corporation; and from April 2002 to the present, I have been employed by Eastman Kodak Company, all in facilities located near St. Paul, Minnesota.

(4) During my employment with 3M Company, Imation Corporation, and Eastman Kodak Company, I have been involved in research and development work in the area of imaging science and materials, and particularly in research and development of photothermographic materials and products. In the course of that work, I have been an inventor or co-inventor of at least 25 inventions, all of which are the subject of granted U.S. patents, pending U.S. patent applications, or published patent applications in other countries. In addition, I am the author or co-author of 1 scientific publication in photothermography.

(5) In view of this considerable academic and professional technical experience, I can say, with appropriate modesty, that I am a worker having at least ordinary skill in the art to which the present invention pertains, namely thermally developable compositions, photothermographic materials, and components thereof including reducing agents.

(6) I am familiar with the Office Action dated June 2, 2005 that has been received during the prosecution of the present application, and the art cited therein, and I believe that I understand the Examiner's arguments in support of her rejection of the presently claimed invention. In particular, I have read and am familiar with the teaching in U.S. Patent 3,827,889 (hereinafter, "Ohkubo et al.") that corresponds to FR Patent publication 1,542,505 ("Masuta") that was cited in the recent Office Action.

(7) The Ohkubo et al. reference (both US and FR counterparts) describe thermally developable light sensitive compositions that include silver halide, a reducing agent, and an aliphatic monocarboxylic acid. The reference teaches that esters of 1-ascorbic acid can be added for alleged benefits. Such esters include 1-ascorbyl palmitate, 1-ascorbyl laurate, and 1-ascorbyl myristate that are described in TABLE I (Examples 1-7).

(8) To me as one of at least ordinary skill in the art, an obvious ascorbic acid ester to try in photothermographic materials to find optimal sensitometric properties and to improve post-processing light stability, is 1-ascorbyl palmitate (L-ascorbic acid-6-palmitate). This compound is relatively inexpensive and commercially available from Aldrich Chemical Company (Milwaukee, WI).

(9) However, when I tried to prepare Solution D (described in TABLE II of Example 1 of the present application), for use in an aqueous-based photothermographic formulation, 1-ascorbyl palmitate would not dissolve. Subsequent heating at 55°C with concurrent use of sonic energy for one half hour also failed to dissolve the 1-ascorbyl palmitate. In contrast, when the same premix was prepared using a molar equivalent amount of 1-ascorbyl pivalate (Compound I-1 of the invention), complete dissolution occurred at 55°C with sonic energy.

I also tried to dissolve 1-ascorbyl palmitate in a solution containing 50% methanol and 50% water as described in Example 2 of present application. 1-Ascorbyl palmitate would not dissolve even when the mixture was heated at 40°C. In contrast 1-ascorbyl pivalate readily dissolved in such a mixture.

Thus, I found 1-ascorbyl palmitate was impossible to use as a reducing agent in the compositions and materials of the presently claimed invention.

(10) We have unexpectedly found that the esters defined by Structure (I) in our Claim 1 did not have the problem exhibited by 1-ascorbyl palmitate. This is unpredictable from the mere differences in chemical structure, i.e. the difference in the length of chain represented by R_1 and R_2 in our Structure (I). In my opinion, the presently claimed invention is therefore unobvious over the teaching in Ohkuba et al. alone or when combined with the two Simpson et al. patents and Taguchi reference that were also cited in the Office Action.

(11) That all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true. These statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: _____ _____

James B. Philip, Jr.

"Declaration 2"

87069JLT
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

William D. Ramsden, et al.

ASCORBIC ACID COMPOUNDS AS REDUCING AGENTS FOR THERMALLY DEVELOPABLE COMPOSITIONS AND IMAGING MATERIALS

Serial No. 10/764,704

Filed 26 January 2004

Group Art Unit: 1752

Examiner: WALKE, Amanda C.

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Sherryl A. Payne

Date

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. 1.132

I, James B. Philip, Jr. declare that:

(1) I am a co-inventor of the invention described and claimed in the present application, along with William D. Ramsden, Doreen C. Lynch, and Paul G. Skoug.

(2) I received a Ph.D. degree in physical organic chemistry from the University of Rochester in 1980. In the course of my graduate studies, I was the co-author of 3 publications that were published during 1978-1981.

(3) From November 1980 to July 1996, I was employed by 3M Company; from July 1996 to March 2002, I was employed by Imation

Corporation; and from April 2002 to the present, I have been employed by Eastman Kodak Company, all in facilities located near St. Paul, Minnesota.

(4) During my employment with 3M Company, Imation Corporation, and Eastman Kodak Company, I have been involved in research and development work in the area of imaging science and materials, and particularly in research and development of photothermographic materials and products. In the course of that work, I have been an inventor or co-inventor of at least 25 inventions, all of which are the subject of granted U.S. patents, pending U.S. patent applications, or published patent applications in other countries. In addition, I am the author or co-author of 1 scientific publication in photothermography.

(5) In view of this considerable academic and professional technical experience, I can say, with appropriate modesty, that I am a worker having at least ordinary skill in the art to which the present invention pertains, namely thermally developable compositions, photothermographic materials, and components thereof including reducing agents.

(6) I am familiar with the "final" Office Action dated November 15, 2005 that has been received during the prosecution of the present application, and the art cited therein, and I believe that I understand the Examiner's arguments in support of her rejection of the presently claimed invention. In particular, I have read and am familiar with the teaching in U.S. Patent 3,827,889 (hereinafter, "Ohkubo et al.") that corresponds to FR Patent publication 1,542,505 ("Masuta") that was cited in the recent Office Action.

(7) The Ohkubo et al. reference (both US and FR counterparts) describe thermally developable light sensitive compositions that include silver halide, a reducing agent, and an aliphatic monocarboxylic acid. The reference teaches that esters of l-ascorbic acid can be added for alleged benefits. Such esters include 1-ascorbyl palmitate, 1-ascorbyl laurate, and 1-ascorbyl myristate that are described in TABLE I (Examples 1-7).

(8) In the earlier Rule 132 Declaration that I presented in the prosecution of this application, I provided evidence that 1-ascorbyl palmitate (L-ascorbic acid-6-palmitate) could not be used in the practice of this invention.

(9) As additional evidence of patentability of the presently claimed invention, I tried to prepare Solution D (described in TABLE II of Example 1 of the present application), for use in an aqueous-based photothermographic formulation, using the laurate ester of ascorbic acid, the myristate ester of ascorbic acid, and the stearate ester of ascorbic acid as described in TABLE I of the noted Ohkubo et al. reference. None of the three esters of ascorbic acid would dissolve in the solution at the molar equivalent to the palmitate ester of ascorbic acid previously tested. Subsequent heating at 55°C with concurrent use of sonic energy for one half hour also failed to dissolve the three esters of ascorbic acid. In contrast, when the same premix was prepared using a molar equivalent amount of 1-ascorbyl pivalate (Compound I-1 of the invention), complete dissolution occurred at 55°C with sonic energy.

As still further evidence of patentability, I also tried to dissolve each of the laurate, stearate, and myristate esters of ascorbic acid in a solution containing 50% methanol and 50% water as described in Example 2 of the present application. None of these esters of ascorbic acid would dissolve even when the mixtures were heated at 40°C. In contrast 1-ascorbyl pivalate readily dissolved in such a mixture.

Thus, I found the laurate, stearate, and myristate esters of ascorbic acid were impossible to use as reducing agents in the compositions and materials of the presently claimed invention.

(10) We have unexpectedly found that the esters defined by Structure (I) in our Claim 1 did not have the problem exhibited by 1-ascorbyl palmitate or the laurate, stearate, and myristate esters of ascorbic acid. This is unpredictable from the mere differences in chemical structure, i.e. the difference in the length of chain represented by R_1 and R_2 in our Structure (I). In my opinion, the presently claimed invention is therefore unobvious over the teaching

in Ohkuba et al. alone or when combined with the two Simpson et al. patents and the Taguchi reference that were also cited in the Office Action.

(11) That all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true. These statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: _____ _____

James B. Philip, Jr.

Appendix III – Related Proceedings

As noted above, there are no related proceedings, appeals, or interferences.